

Concepts in Urbanization and Early State Formation: The Case of Minoan Crete

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Abstract

Urbanization is a concept central to theories of ancient state formation. Urbanization, agriculture, and population growth are related to one another in ways that impose constraints on each, yielding more information from evidence regarding any one of the three than is sometimes inferred. Concepts of control by and power of elites or would-be emergent rulers benefit from specification of control mechanisms and explicit recognition of constraints on the exercise of power. Making explicit the individual behavioral basis of the actions within each of these concepts fosters a compatible synthesis of agency and process approaches to theorizing about early state formation. Whether societal developments leading to emergence of states occurred slowly or in a revolution, while a matter of time, involves sufficient duration necessary for considerable social learning. In comparison, developmental periods leading to emergence of states on Crete have been suggested, at least implicitly, to have ranged from as little as 350 years to as long as 1,500, while estimates of comparable developmental periods in the ancient Near East and Egypt have ranged from 200 to 4,000 years.

Urbanization in antiquity certainly continued well after state forms of governance had been developed, but the formation of states, either primary (sometimes called pristine) or secondary, generally is considered to have occurred along with urbanization. In a number of studies of early state formation on Minoan Crete, I believe some useful information implicit in well-accepted relationships has been less than fully utilized. More complete utilization of that information would further the aims of research on societal developments in Minoan-Period Crete. The first such set of relationships takes the form of mutual constraints among urbanization, agriculture, and population growth which provide a background of possibilities for urbanization in particular. Within this set of parametric relationships, resource costs of certain urban infrastructure, remains of which can be observed, have implications for territory size as well as for organizational features which may not have left observable remains. The second is a series of factors commonly considered of importance to the emergence of early states but which tend to be characterized in sufficiently general terms as to not facilitate close analysis of their implications: control and power, monopolization of various activities, and imports. While many ancient details of these issues will remain veiled, certain relationships within and among them permit further analysis of possible ancient policies and practices involved in the development of ancient state administrations. Third, behind these two major groups of societal and behavioral

relationships lurks the issue of “how long could it have taken, and why?” which brings in the continuing issue of evolutionary versus revolutionary developments having led to the emergence of the monumental building sites (formerly and sometimes still called “palaces”¹) in MM I-II. My approach to the role of time involves societal learning, with a focus on heavy construction, using evidence from Egypt and the ancient Near East, although other fields such as record-keeping and jurisprudence surely would be fruitful topics to consider from such a perspective. To offer comparative perspective, I review a number of assessments of developmental periods for early states in Egypt and the ancient Near East. A final section pulls together implications from the individual components described just above to suggest some restrictions on, or what might alternatively be considered hypotheses regarding, early state formation on Minoan Crete. This section emphasizes the individual decisions commonly known as agency that underlie the larger-scale forces such as urbanization and the emergence of governmental authority. Throughout, my emphasis is on ways of thinking about ancient social behavior rather than on interpretation of the latest excavation or survey results. This is not to imply that my reasoning is not tethered to evidence, rather that the stress is on the analytical approach to the social relationships involved, whatever the current evidence may or may not reveal. Sometimes absence of material evidence of some kind of behavior or organization need not deter acceptance of its existence.

Before embarking on my analysis however, I hasten to alert the reader that I will consciously violate some current preferences regarding de-familiarization of the past² on grounds which I explain. I agree thoroughly that using contemporary or even recent institutions and artifacts as raw guides to interpretation of ancient institutions and artifacts is a recipe for blinkered understanding, if not worse. Similarly with efforts of contemporary scholars to put themselves as much as possible in the minds of people of previous times, trying to eliminate what we know that they did not and vice versa.³ Numerous scholars have warned of the dangers of using contemporary common sense when studying, interpreting, and explaining events and artifacts of antiquity. Nonetheless, it seems possible to press these efforts of distancing oneself from knowledge associated with the present into the realm of nihilism, where the previous existence of some very basic elements of human behavior and organization is held in abeyance for “want of evidence.” I will employ several concepts whose existence has been called into question, I believe more because of association with their contemporary forms than because of the logically optional quality of their previous existence. The first of these is government. Any group larger than one possesses some government structure, whatever it may be called, to adjudicate and accommodate differences. As groups acquire more members, the scope of government broadens and its activities become more intricate. The forms government can take have of course quite broad parameters and need not be thought of as having a person with particularly prescribed authorities at its head. The second is territory, in the sense of a geographic area subject to uses determined by some group that can enforce its decisions regarding those uses. To offer a specific example, suppose some governing groups existed at, say, Knossos and Phaistos and collected some form of tax from residents within a certain distance of those two sites. At some distance, both Knossos and Phaistos might try to collect their tax from the same unlucky farmer, who would object; before long the Knossos and Phaistos

¹ As discussed by Adams (2010, 5).

² For example, Hamilakis (2002, 18-19).

³ Baxandall (1985, 109-111) provides an elegant statement of the problem, which he concludes with the reminder that the resulting explanation is for the contemporary observer, not the ancient participant.

tax collectors would reach an agreement about which farmers each would tax, avoiding double taxation as well as clashes. They might even suggest some lines on the ground within which each of them could enforce their decisions. The resulting areas I would call their territories, although other names could certainly serve.⁴ Third is the term public sector, which has a decidedly modernist ring, but simply refers to activities of a government. Whether a government was headed by a single person or a group of more or less peers makes no difference to the existence of a group of activities they set in motion.

1. Urbanization

The first three pieces of information deal with characteristics of the urbanization observed: the financing of the palatial architecture whose remains are observed—or if the remains are not actually of palaces, they are certainly of monumental proportion; the pace of growth of ancient populations; and the productivity of agriculture. Urbanization can take place under many conditions other than those involving the formation of a new state, so while the observations regarding urbanization below put constraints on the relationships between urbanization and state formation, they apply more generally to urbanization in antiquity. Since the productivity of agriculture may seem like a non sequitur when addressing urbanization, I begin with that topic.

1.1 Agricultural Productivity and Transportation Technology

Agricultural productivity in antiquity is widely believed to have been quite low by contemporary or even recent historical standards. Threat of famine was always lurking around the corner. Rather than one agriculturalist being able to produce enough to feed, say four or five other people, he or she could feed only a fraction above one. This technological factor places a low ceiling on the proportion of the work force that could have not been in agriculture. Considering the difficulty of transporting bulk agricultural goods, especially overland, most people surely lived relatively close by their primary food sources, a fact which places a ceiling on the proportion of the population that could have been urbanized, that is, have lived in one of the major towns such as Knossos, Malia, or Phaistos. Major movements to towns, which would have emptied the countryside to a great extent, would have been incompatible with the agricultural and transportation technologies of the time, despite occasional reports from surveys of widespread abandonment of the countryside around the time of the construction of the first palaces in particular.⁵ This reasoning is more akin to an accounting matter than to a problematic prediction of a contemporary behavioral theory which some scholars might consider modernizing or otherwise anachronistic. The conclusion from the application of these two pieces of known technological characteristics of antiquity is that the towns—or cities—in which the major Minoan palaces were located could have housed only a relatively small proportion of the

⁴ Adams (2006, 2-3) addresses this issue from the perspective of regions of various types, one of which is political, which is the type of territory I have in mind. While it is clearly reasonable to view boundaries of various types of cultural, or even economic (however defined) regions as “fluid,” to use Adams’ term, reasoning regarding the purposes to which political territories are put suggests clear boundaries for fiscal purposes.

⁵ E.g., Watrous, Hadzi-Vallianou, and Blitzer (2004, 253) reports a sharp reduction in the number of settlements from EM II to MM IA in their survey areas around Phaistos.

island's population, even if many town dwellers remained agriculturalists and walked to their fields daily. They could not have walked too far on a diurnal schedule, and the extent of the land they could have reached on those walks would have been insufficient to feed a heavily urbanized population.⁶

This said, removal of some proportion of the agricultural work force to cities, or a city, where a good proportion of those relocating took up non-agricultural endeavors, would have required at least some modest changes in agricultural techniques—not necessarily different technologies, just different choices of technique within a largely constant technology such as using labor more sparingly since there was a little bit less of it after some migration to the new city.

1.2 Financing the Architecture

The palatial (although monumental may be a preferred term) architecture whose remains are observed at Knossos, Malia, and Phaistos was almost surely not private property.⁷ In the lexicon of contemporary economics, those buildings were in the public sector. Financing by a public sector involves the equivalent of taxation by whatever name might be given to the collection mechanisms. Considering the sheer size of those structures, and the expense of building them, as well as maintaining and operating them once they were built, the collection plate must have been passed widely, meaning over a considerable territory, not simply among the residents of the town or those residing within a few kilometers beyond the towns' outskirts. Those buildings are prime facie evidence of those palaces' (or the governments associated with them) ability to collect taxes over a considerable geographic area.

Whatever sort of power or influence these governments (for surely they were governments) possessed over their territories—and far more specific proposals need to be made for progress in understanding their administrations—it was sufficient to raise the resources via a tax rate that was not crippling to its subjects or citizens. The palace (monumental architectural) complexes stood and functioned for several hundred years, which is good stability by virtually any standard.

An associated implication of the financing of these extensive construction projects involves the record-keeping involved. The resources collected were extensive enough that keeping track who had paid what, who had not, etc., would have required an administrative infrastructure to ensure payment and proper disbursement to suppliers. Another implication associated with the financing is the existence of societal structures required to agree on the buildings in the first place: what and where, in particular. Most of the MM I-II monumental structures were built over the remains of previous monumental structures, not on what today would be called greenfields available for the taking, so there were clearly societal structures that

⁶ Chisholm (1962, Chapter 4) long ago presented extensive evidence on the reduction in agricultural output occasioned by farmers' having to travel greater—but still modest, typically no further than 5 kilometers—distances to their plots. A Finnish example exhibited a 56 percent reduction in gross output at 5 kilometers relative to 0 to 0.1 kilometer of travel (i.e., living on the farm) and an 87 percent reduction in net output: 55, Table 2.

⁷ Although possibly Quartier Mu at Malia might have been, if Schoep's reasoning is correct that it was the residence of someone who was not the ruler or whatever the leader of the governing structure would have been called: Schoep (2002, 117-20); and (2006, 50). On the other hand, if it was the residence of the ruler, and the structures identified as palatial were strictly non-residential structures, there would have been some public-sector character to Quartier Mu's architecture, and it would have been financed through taxation too.

gave permission, or legitimacy, to the subsequent buildings' siting. It might not be a stretch to call such a structure a legal system.

1.3 Growth Rates of Ancient Populations

How rapidly could a major city—relatively speaking—have emerged from a simple, Final Neolithic or Early Minoan I town? Populations grew quite slowly in antiquity. Birth rates may have been high, but infant and child mortality was very high also. Maternal mortality is thought to have been high as well, and even adult men had high death rates relative to modern, industrial populations. What might be implied by a “rapid urbanization” in, say, the EM III or MM IB-IIA period? Consider a gradual, constant growth-rate approach first. Suppose we want to posit that, say, Knossos grew from a village with a population of 500 people to a town or city of 10,000 in 100 years.⁸ That is about a 3 percent per year growth rate on average for a century, clearly far too high for natural increase but plausible for rural-to-urban migration. Suppose also that the entire population grew at 1 percent per year growth rate, which is high for an ancient population, but a period of unusual health and prosperity may have been the background for state formation and the accompanying urbanization. At the end of the century, this hypothetical Knossos contained 5 percent of the population of 200,000.⁹ What would have been plausible

⁸ Cherry (1984, 32) suggests that Protopalatial Knossos “probably housed a population in the range of ten to twenty thousand.” On the basis of more detailed analysis, Whitelaw (1999, 153) estimates a population for the city in the Second Palace Period between 14,000 and 18,000. Whitelaw’s most recent study of Knossos populations offers estimates at four dates—Final Neolithic, 1,000 ca. 3000 B.C.E., 2,500 around the beginning of EM IIIA, ca. 2200 B.C.E., 11,000 around the beginning of MM IB, ca. 1950 B.C.E., and 17,000 around the beginning of MM III, ca. 1800 B.C.E. The most rapid growth period is the 250-year period during EM III and MM IA, an average of 0.6 percent per year, which could accommodate some shorter bursts of more rapid urbanization. The preceding period averages a 0.1 percent per year average growth rate, quite plausible for an ancient population, and the succeeding one an intermediate 0.3 percent per year average, not implausible for a period of sustained, if less burgeoning, urbanization (2011, 155, Figure 4.14). Long before, Whitelaw (1983, 339) had estimated EM I – EM II populations at Knossos, Malia, and Phaistos at ca. 1,290-1,940, 690-1,030, and 300-450. Both estimates are based on judgments regarding residential population density, with that technique’s well-known hazards, but such is the primary method of estimating all ancient city populations; although no one particularly likes the technique, considering its scope for error, superior alternatives have not emerged. And Whitelaw’s estimate for Knossos does not seem unreasonable. Of course, Whitelaw’s is not the only population estimate for Knossos. Hood and Smyth (1981, 10), using an estimate of 1,200 houses and 10 occupants on average per house, estimates the population of Knossos in EM III – MM I at 12,000 and the entire 20-square kilometer hinterland, containing the port town of Katsambas, at 15,000 to 20,000; they acknowledge the “unsatisfactory method but note that using Henri Frankfort’s estimate of 400 people per hectare on an area the size of Knossos would give the same figure. Manning (1993, 42) notes the literature’s consistent lowering of residential densities for ancient cities, from the high levels such as used by Frankfort, down to the range of 100 to 150 per hectare. Watrous and Hadzi-Vallianou (2004, 277) estimate the population of Protopalatial Knossos at 3,750 to 11,250 souls, based on a density of 50 to 100 people per hectare and an area of 75 hectares (7,500, 75 acres times 100 people per acre, is the midpoint of this range, which the authors do not mention; they do not explain the range of 50 percent around their midpoint, but its magnitude probably is not unreasonable although it does give a range three times the lower estimate). Watrous and Hadzi-Vallianou offer a population estimate for EM II Phaistos but not for EM II Knossos; their estimate for Phaistos implies an annual average growth rate somewhere between 0.25 percent per year and 0.29 percent, which is a decent clip for ancient populations but, spread out over a millennium as the two population estimates are, gives the impression of natural increase within the town-becoming-a-city rather than urbanization of the surrounding rural population as it grew (2004, 238).

⁹ The 200,000 figure derives from an assumption that a Knossos of 10,000 population was 5 percent of the population after the end of a century of growth at 1 percent per year. (Two hundred thousand may be high, in which case, adjustments could be made to the percent of the population residing in Knossos to somewhere between 5 and

rates of emigration from the countryside to the city? Suppose that at the midpoint of the century witnessing the growth, 5 percent of the people in the countryside emigrated to the city; with a midpoint total rural population of some 117 thousand people, nearly 5,900 would move into the city in year 50 alone—far too large a number for a city of only 10,000 50 years later. However, the 3 percent annual growth rate of the town itself would imply a movement of only 67 people from the countryside to the town at year 50, a number virtually unnoticeable among the rural population of 117 thousand at that date.

Of course, a more plausible course of growth that moved asymptotically to a relatively unchanging proportion of the population would not have been a constant 3 percent growth rate for a century that dropped to zero after the one hundredth year. A more realistic pattern might have begun with a low growth rate which increased for maybe the first half of the century and then leveled off to a growth rate that matched that of the population at large. The decennial population growth rates of New York City from 1790 through 1890,¹⁰ if applied to an initial population of 500 people, would yield a population of nearly 23 thousand in a century. At such a growth rate (assuming the hypothetical, or possibly even the actual, ancient Knossos reached about 20,000 population), the mid-century population transfer from countryside to city would have been about 470 people per year, or a little less than ½ percent of the rural population of 117 thousand at that date. These numbers suggest that the question “where would the people have come from for rapid urbanization?” need not be a major stumbling block to a hundred-year burst of urban development in a population of plausible size.¹¹

an upper range of around 10 percent.) At the beginning of the century, the total population would have been some 73 thousand, and at mid-century 117 thousand, encountered just below. This is a heuristic example, assuming contrary to fact that Knossos was the only city on Minoan Crete, while we know of at least Malia, Phaistos, Petras, Gournia, and Mochlos during the Pre- and Proto-Palatial periods, with possibly others that early, but certainly entering the picture within several centuries. If the Knossos population and the overall 5-percent urbanization were both left unchanged, the total population of the Prepalatial Crete being modeled here would have to increase by the same ratio of the total urban population to the Knossos population. Nonetheless, estimates of 42 to 49 percent of “palatial Crete’s” population being urban, built up from estimates of farmsteads, number of towns, and population densities, are out of the realm of possibility: Branigan (2001, 46-47, Tables 3.3 and 3.4). To offer context, the United Kingdom reached the 50 percent urban mark in its 1851 census; the United States was only 39 percent urban in 1900. Claims about Mesopotamia that place large proportions of the populations in the cities are difficult to credit, considering the agricultural and transportation technologies.

¹⁰ From 1790 to 1800, 83%; from 1800 to 1810, 59%; and over subsequent decades through 1880 to 1890: 28%, 64%, 54%, 65%, 58%, 16%, 28%, and 26%: <http://physics.bu.edu/~redner/projects/population/cities/newyork.html>. Roughly halving these growth rates would yield a city of around 10,000 after a century. A growth pattern paralleling that of Chicago’s would be much more explosive: starting from the same initial population of 500, the population would grow to over 120 thousand within 50 years. New York had been established as a commercial entrepôt city for over 100 years at the time we pick up its population growth in 1790, while Chicago was just rising out of its swamps in 1840. The technologies involved, the demographic backgrounds, and the geographical situations all differ between the two American cities, with neither precisely paralleling what we might think Knossos (or Phaistos or Malia for that matter) faced some 4,000 years before. Both were in a young nation in the North Atlantic economic-demographic system, which had the high population growth rates of the mid-Demographic Transition and in addition was the recipient of considerable net immigration. Nonetheless, the examples of strong, rapid, not necessarily constant growth are useful for thinking about how early palatial period growth might have occurred in these Minoan cities or towns.

¹¹ Cadogan (1986, 162) suggests that improving health on Crete during the Middle Minoan Period, relative to the Early Minoan Period, led to increased longevity and birth rates. Cadogan’s suggestion relies on evidence presented in Halstead (1977, 109, Figures 1-10). Halstead’s analysis relies in turn on demographic evidence from skeletal evidence studied by J. L. Angel and R.-P. Charles. The direct evidence upon which Cadogan relies is older ages at death, which were considerably older in Crete than the Greek mainland in both the Early and Middle Bronze age samples. He infers better health from the greater longevity and better nutrition from the inferred better health.

I have not considered whether the urban population might have experienced a non-zero natural increase (in a zero natural increase case the birth rate would be exactly offset by the death rate), which need not necessarily have been the case in a large, pre-industrial city with its sanitation problems. With the rate of natural increase in the rural population as low as it surely was, the rate of natural increase in the city itself may have barely sustained the resident population, leaving the entire increase to immigration. For the first eighty years, the fraction of the city's population that was resident for less than a decade would not fall below one-third. This fresh-from-the-countryside population surely would have affected the ambience, for want of a better term, of the city in ways worth contemplating.

2. Early State Formation

The literature on early state formation is vast and diffuse, even that focused only on Minoan Crete, and I will not address it in any systematic fashion here. That said, I agree with Yoffee¹² that efforts to isolate discrete categories of social organization or governance such as bands, tribes and states which can be identified by a few characteristics of material finds in excavations and extrapolated to other, unobservable characteristics of a community are wont to impose clearer boundaries than are likely to have existed and that the temporal development of various components of these societies need not have been aligned in a lock-step so as to produce revolutionary jumps from one organizational form to another. Further, Dabney's concept of early state formation as a process, which in the case of the Minoan palatial states may have continued into the Neopalatial Period as various components of the states took time to develop, is a sound one.¹³

The literature on state formation on Crete has referred to a number of concepts that remain less well defined than is productive of clear discussion. Rather than identify specific studies as examples of reliance on these vague concepts, I simply identify the concepts and offer some sharpening of them.

2.1 Control and Power

Control is a common theme in discussions of ancient economies, but what is meant by the term by various authors is seldom made explicit. The concept of control implies a great deal of precision in the response of controlled economic agents to requests or demands by agents issuing

¹² Yoffee (2005, Chapter 2).

¹³ Dabney (1995). Her "cart-before-the-horse" concept involving the construction of the palaces prior to the development of the social and economic infrastructure to either build those structures or administer them is surely too much of a reversal of plausible ordering of events which should be sequentially enabling of one another. However, a modest softening of the concept to the construction of the palaces eliciting the required administrative skills and capacity which were underestimated at the beginning of the construction program is reasonable and conforms well to the notion of early state emergence as a process rather than an event. As few ideas find no precedents in the literature, Dabney's concept of continuing development is foreshadowed by Cherry (1984, 33) who noted the dangers of assuming that the Old and New Palaces were "systems of the same essential kind," and by Branigan (1988,63), who expressed the opinion that "the palatial system was developing and changing throughout the Middle Minoan period." Given these precedents, Dabney's explicit characterization of state formation as a process remains a quantum leap in conceptualizing state formation. The concept may be the default view of Minoan state formation presently, as represented by Whitelaw (2011, 114), suggesting cumulative development through both palatial periods.

the demands, in fact, far beyond the precision ever likely to be guaranteed with any technology. Consider an example. Suppose we believe that some agent of authority in a palace controls agricultural production in the region under his or her purview: so many bushels of grain. What if the weather turns dry during the growing season or excessively wet at harvest time? Those bushels of grain produced will fall shy of the number demanded. But alternatively, suppose the “control” involves only the amount delivered to the palace; if the farmers have to give up say, 75 percent of their harvest instead of an anticipated 15 percent, will they actually do it and face the likely starvation that would result? Since much of the resources ancient governments were able to collect from their subjects were comprised of agricultural products since money either did not exist or the economy was not highly monetized (certainly not in the Bronze Age), the uncertainty of agricultural production and the corresponding uncertainty of the response of farmers charged with certain exactions to variations in their production leave the concept of economic control with a great deal of scope for negotiation.

Discussions involving a government’s or a ruler’s “control” of an economy seldom dip to such specificity of content. More useful concepts than simple “control” might be along the lines of policy instruments believed to have been at a government’s disposal (i.e., how they extracted tax revenues, by whatever name we care to give such extractions), their likely effectiveness in terms of the government’s putative objectives, and the government’s ability to enforce its policies, which steers us into the notion of power. An additional dimension of “control,” or an additional policy instrument to state it alternatively, would have been, in contemporary terms, border control: much interest has been expressed in the finds of Mesara-made ceramics at Knossos and other instances of some kind of interregional or possibly interstate (interpolity) commerce. How did, or might have, these early governments treated their borderlands? Did outlying villages understand clearly under whose suzerainty they existed? Might they have found confirmation by which of the palace government agents came around to collect part of their crops as tax payment? Might the governments have at least attempted to interfere with exchanges of products between private individuals, say village farmers, possibly in the form of prohibitions or tariffs? Might villages near the borders between regions or states have been subject to official predations from both governments? Might the governments have reached some agreements about which villages were “theirs”? Would such agreements, to avoid conflict, have constituted a foreign policy with a bureaucracy to administer it? What tasks did these putative ancient states face that they must have dealt with in one way or another? Do we prefer to see neighboring interstate (interpolity) interaction as a Hobbesian war of all against all or do we envision their having sat down and talked with one another? We surely will not know answers to many, if any, of these questions, but simply asking them could sharpen investigation of what we can observe.

“Power,” likewise, is a concept encountered frequently in discussions of ancient states without definition.¹⁴ In some usages it may be synonymous with “control,” or at least as representing the ability to exert unspecified controls. A common implication of the term seems to be the ability to exert military force to achieve a government’s economic and other goals vis-à-vis its subjects, as well as possibly against its neighbors. As many a government or occupying force, in contemporary as well as ancient times, has discovered to its chagrin, simple reliance on force to achieve one’s goals fails eventually if not sooner. Yoffee offers examples from the failure of several of the early states in Mesopotamia, generally following from their inability or

¹⁴ Despite an enormous literature, including an archaeological component, on power and its many nuances, which is helpfully summarized in Thurston (2010, 194-206).

disinclination to obtain political legitimacy among subjects.¹⁵ In the literature of Minoan state formation discussions of power exercised by the governments of ancient states do not commonly proceed in terms of exchanges between governing bodies and subjects which could have legitimized the exactions of the government in the form of law and eliminated all but the implicit use of force as a requirement for collecting its tax revenues.¹⁶ Nonetheless, there is extensive reference to palatial governments (my term, not that of the literature) endeavoring to reproduce social forms via rituals, particularly by undertaking unspecified actions vis-à-vis peak sanctuaries. Although most peak sanctuaries look like quite locally arranged affairs, the timing of their appearance seems to coincide roughly with the emergence of the Early Palaces, and the appeal in the literature is effectively to the provision of a public good in the form of religious functions which would have had the intention of bolstering the legitimacy of the ruling body or government,¹⁷ which would make tax collection easier, thus tying together the concepts of “control” and “power,” or at least power’s limits, in a specific relationship and giving more precise content to both concepts.

2.2 Monopolization

One instrument of control and exercise of power commonly cited in the literature of ancient state formation is referred to as monopolization. The role of monopolization in the literature on ancient state formation is to enhance the prestige of people who are allowed to have certain items relative to the great majority of the people who are not allowed to have them. Prestige is thought to enhance power, if not necessarily legitimacy in the sense of political acceptance of a particular status quo.

While imports, particularly luxury imports, are commonly considered to be subjects of such monopolization efforts, the literature also makes common reference to the monopolization of some types of skilled labor and various types of products or raw materials by the palace elite (a complimentary term for “powerful people”). Used to refer to such actions, the term “monopolization” is used in the colloquial sense such as, “John tried to monopolize the conversation,” in which “monopolization” is closer in meaning to “to capture” or to the even more colloquial verb “to hog.” The closest economic concept to this use of the term monopolization is probably demand suppression. As a technical term in economics, monopoly involves a single producer of a good, possibly because of high entry costs for competitors, either real resource costs or by virtue of an administrative creation preventing entry by competitors who otherwise would enter production, effectively supply suppression. This position as a single supplier confers on the monopolistic producer the ability to increase the price above what it would be with competition by reducing the output, forcing consumers to work up their demand curves, which would indicate that they would be willing to pay a higher price per unit if they are constrained to consume a smaller number of units. The economic literature on monopoly will not be relevant to the actions referred to as monopolization in the sense of capturing or hogging.

¹⁵ Yoffee (2005, 140-151).

¹⁶ Yoffee (2005, 138-139) discusses Shmuel Eisenstadt’s early (1960s) focus on the provision of valued public goods as the source of an ancient state’s government’s political legitimacy, specifically the provision of juridical services, defense of boundaries, and upholding of dominant cultural symbols. Cherry (1984, 33-34) acknowledges the possibility that these governments provided some public goods but expressly puts little weight on it.

¹⁷ E.g., Cherry (1984, 34-35) who continues to suggest the concept as a weak alternative to force.

A palace governing official who forbade a skilled craftsman to take an order from anyone other than himself or herself would, according to the current usage in the literature of early state formation, be monopolizing that craftsman's labor. Economically speaking, she is doing no such thing. If her actions are having any effect on the price of the craftsman's goods and labor, they would depress them by restricting the demand for them. Correspondingly, in the concept of the palace officials monopolizing the Minoan religion or its symbols, the palaces are simultaneously thought to have flooded the society with religious symbols which presumably left observers thinking of the palace officials, from horns of consecration to double axes to peak sanctuaries which displayed both and more. This flooding of the market with the religious product is actually the opposite of what a monopolist would do, but if the palace restricted the officiation of religious rituals to palace officials, that would involve a kind of artificial restriction of the suppliers, if not necessarily of what they supplied. Such a restriction is closer structurally to licensing, such as of doctors or hairdressers, than to monopoly as a consequence of production technologies. Restriction of entry on new deities into a pantheon has been more the *modus operandi* of alter monotheistic religions than of the polytheistic Bronze Age religions, and the economic concept of monopoly seems to have little application to practices in those religions.

Once again, this closer attention to the theoretical structure of practices believed to have occurred during early state formation improves the chances of understanding their consequences, possibly their motivations, and even the likelihood of their having been implemented.

2.3 Imports

Imports are one kind of item palatial power brokers are considered to have restricted, thereby enhancing their prestige. Long-distance trade in relatively low-value, high-bulk commodities such as grains was not common during the Early Bronze Age, although it is not impossible that some shipments of such commodities might have moved on the Mesopotamian rivers. Transportation was expensive, and to bear shipping costs, the items carried had to be high-value. Not very many people could afford them. There's little mystery involved in the restriction of imports to the wealthy, that is, primarily to palace officials, as well as the occasional wealthy rural member of the nobility. Simple income differences would have been sufficient to restrict purchases to the wealthy. Cost alone would have rationed such imports to the elite, without recourse to an implicit list of who was entitled to consume particular items. The prestige conferred by such consumption, conspicuous either because it's difficult to disguise and no one else has it or because one flaunts it, was the subject of Thorsten Veblen's discourse of a century ago, rediscovered repeatedly by twentieth century anthropologists in the Southwest Pacific. Cost considerations aside, there remains a possible rationale for restricting rights to import, if not necessarily rights to sell once imported: taxes on imports can be far cheaper to collect than taxes on more dispersed bases.

Interruption of foreign trade in luxuries has occasionally been cited as posing dangers for governing elites during the Bronze Age, Late as well as Early. If that was genuinely the case, it could not have been because of ensuing economic dislocations, because the magnitudes of the resources involved relative to the entire economy (think of such an anachronistic concept as a percentage of national income or gross domestic product) were surely very small, probably less than single-digit in percentage terms. If the inability to display, say, an ostrich egg shell in public posed a serious problem for the continuing legitimacy of a ruler, that would have been one matter, but her accountants wouldn't have missed it.

3. Evolution and Revolution

Beyond this attention to a few key concepts, it is difficult to ignore John Cherry's thesis of a revolutionary state development in contrast to the otherwise widely prevailing view of evolutionary development, which may indeed linger as an intellectual artifact of 19th century social thought, although surely it has absorbed many strands of 20th century social science by now. I address several of the concepts that feature centrally in not only Cherry's thesis but in the literature of the gradualist point of view.

The debate over how to characterize the emergence of the monumental MM I-II sites on Crete has continued at various levels of intensity for some three decades. The focus has been to a great extent on material remains and their interpretation. Events or processes that may have left less of a material record have remained outside the principal focus of disagreements. The first sub-section below focuses on processes that happen over time, that in fact require sufficient time to pass to mature, giving particular attention to construction. The following sub-section offers judgments on durations of time involved in urbanization and state formation in Egypt and Mesopotamia as comparisons for opinions on the length of developmental period on Crete.

3.1 Time as a Causal Variable

One of Cherry's three principal complaints about the gradualist perspective on Minoan societal development and state formation has been that time alone appeared to be a, or the, principal explanatory variable driving social changes.¹⁸ Surely none of the proponents of gradual development meant for time alone to explain anything, but rather that many developments, the outlines of which remain unknown, took time to percolate and eventually emerge as social structures different from what went before.

This is pretty abstract. What can the contents of the social developments represented by time possibly have been? In something of a mea culpa piece for what he considered previous excessive reliance on time alone without explanation of what it represented, Branigan has suggested several more specific sets of events for which he had previously let time be a surrogate.¹⁹ As an entry point into these developments, population grew during the Early Bronze Age on Crete,²⁰ resulting in more (rural) settlements and a larger number of large settlements. Branigan does not go into the social mechanics of the importance of these demographic developments, but it is not difficult to imagine people learning over extended periods of time how to live in larger groups—settle personal differences; provide for the joint consumption of items subsumed under the rubric of public goods: things too big for a single family to build by itself, things that would benefit many people, such as a dam or a bridge; and surely other aspects of living together in closer proximity. Leaders may have emerged from people working together to determine how to deal with these matters, resulting in social stratification that found its way into burial remains and other evidence regarding social rituals, religious or otherwise.

¹⁸ Cherry (1983, 33).

¹⁹ Branigan (1995, 33-39).

²⁰ This restriction to the EBA does not address possible developments beginning in the Final or even the Late Neolithic, which could be considered relevant time periods in a lengthy, gradualist perspective.

Somewhat closer to the substance of the construction of the First Palaces is the time required to master architectural, engineering, and related construction skills, among both the planners (the architects and engineers) and the craftsmen whose efforts were organized and directed by the planners. How did Cretan society learn to build monumental stone buildings that not only did not fall down under their own weight at the time, but continue to exhibit some substantial upright remains in places today? The simple structures at, say, Fournou Koriphi probably were not on the direct line of an architectural learning curve to the putative monumental EM II structure in Block Chi at Palaikastro or any of the Early Palaces. Appeals have been made to the Near East as a source of importation of the concept of a palace, but the details of implementing such an import have not been addressed, nor the prevalence of mud brick architecture in the ancient Near East,²¹ whereas the Cretan palaces and other monumental-scale buildings were built of ashlar masonry. Consider the details of importing an architectural idea: 1) either training local architects at overseas locations and repatriating them or bringing in expatriate architects and having them work with local craftsmen; 2) training local craftsmen to undertake the operations involved in cutting, transporting, and maneuvering large stone blocks using ropes, wedges, and various earthen platforms; 3) organizing all the activities and movements so the right things come together at more or less the correct places and times, more a builder's concern than an architect's, but still an important part of getting large, complicated structures installed on the ground. Although his focus is on Classical Greek monumental architecture, Cooper's analysis of the skills employed by architects and construction engineers in doing such things as selecting stone from specific sites for specific characteristics of strength and plasticity and constructing foundations to accommodate both drainage and seismicity characteristics of a site suggest the subtlety of the skills involved at any time in antiquity, although it does not speak to the length of time required for a community of architects to acquire this knowledge that they could thence pass on by various means.²² That is a topic that has not been seriously addressed, as far as I can determine.

The idea that Imhotep, the putative architect of the Step Pyramid of Djoser at Saqqara, in Egypt's Third Dynasty took Egyptian construction from mud bricks and wooden supports to cut stone masonry in effectively a single generation is simply not well thought-out, even though tangible evidence of the previous learning has not been found.^{23,24} In his analytical catalogue of the distinctions between an architect/designer and a builder, Fitchen enumerates a daunting number of practical implementation problems builders have always faced, from building roads to

²¹ Moorey (1994, 335-336). Not entirely mud brick, of course, as noted below for the case of the use of orthostats in North Syria from the early Middle Bronze Age, and as reported by Hiller (1987, 61 and Figure 5) for orthostats at Ebla, which was probably destroyed prior to the construction of the First Palace at Phaistos.

²² Cooper (2008).

²³ For details on construction of the Step Pyramid, Badawy (1990 [1954], 127-131); subsequent numbers in the text of this paragraph are to Badawy. Clarke and Englebach (1930, Chapter 1) discusses possibilities of learning about masonry construction during the Third through the Fifth Dynasties. On the suggestion of a single generation's learning in stone construction of pyramids, Hornung (1999, p. 11). Hornung did follow this single-generation statement with an assessment of the increasing complexity of the next several pyramids (17-18).

²⁴ Chances are good that Imhotep followed a number of competent predecessors, each of whom stood on the proverbial shoulders of their own predecessors as well as colleagues who were competent enough and lucky enough to make observations and associations with largely pre-masonry construction that provided the foundation from which Imhotep and his own unknown colleagues worked. The concept of cumulative knowledge, in contrast to the idea of advances resulting from the genius of the occasional great man, as developed by Usher (1954, Chapter 4) has been a major influence on the contemporary economic theory of invention and technological change. The concept also lengthens the time period involved with the development of mechanical, if pre-scientific, understanding.

transport materials and barracks or towns to house workers (a topic becoming better known from Egyptian pyramid towns) to determining efficient transportation routes to lifting and fitting large stone blocks to understanding qualities of various materials and on and on.²⁵ One must wonder just how long, how many construction projects, it took to develop and pass on the knowledge of what was needed. The three pyramids of the end of the Third Dynasty show technical advances in the handling of stone and in building in larger blocks (p. 133). Differences between the sparse cult buildings in Djoser's complex and the compact plan of Khafra's mortuary temple point to what Badawy believes to have been "a long period of development" (actually only about 120 years) (pp. 125-126). The ground plans of the four pyramids of the Third Dynasty increased in area by something over a factor of 3 from the first to the fourth (p. 135). Stone handicraft was mastered by Third Dynasty builders. Learning during the construction of the Step Pyramid is obvious: the project began as a mastaba which was enlarged twice, then changed four more times into the stepped form of the pyramid (p. 127). At Khufu's pyramid, an earlier, abandoned attempt was found. A trial-and-error process in the construction of interior apartments beneath the pyramid has been identified (p. 155). Additionally, as a potential source for vaulted tombs of EM Crete, corbelling in brick was known in Second Dynasty Egypt, and in stone for internal chambers of pyramids, as well a corridor ceiling (pp. 133, 137). In his highly analytical chapter on Egyptian stone building, Arnold infers that the earliest real stone masonry in Egypt, that of the Third Dynasty, was still influenced by earlier brick architecture, and that the use of larger blocks in the Fourth Dynasty may have resulted from efforts to economize on the number of trained masons, giving hints of learning in construction, even if learning periods remain implicit.²⁶

In early Mesopotamia, a rare (to my knowledge), as well as quite spare, indication of learning in construction is Frankfort's comparison of temples built about a thousand years apart in the Protoliterate Period: "The temple of Tepe Gawra appears rather tentative and experimental when we compare it with the last temple built at Abu Shahrein (Eridu) during the Al 'Ubaid Period."²⁷ Information is available in the excavation reports to analyze characteristics of the

²⁵ Fitchen (1986, Chapter 1). The Egyptians may have accumulated considerable logistical learning, without much in the way of stone architectural construction, in the mortuary constructions of the Early Dynastic Period, for example with Den's tomb of the First Dynasty at Abydos and Khasekhemwy's Second Dynasty mortuary enclosure at Abydos and his probable temple construction projects at Hierakonpolis, which Wilkinson considers would have required the mobilization of considerable manpower and resources (1999, 93, 142, 236).

²⁶ Arnold (1991, 120-122). Arnold's Chapter 4, on building, contains chronological information on solutions to a number of problems, from stability of foundations to the development of cores and casings of pyramids and later monumental architecture. Arnold's problem-solving approach to architectural features, combined with the clear changes in techniques in Egypt, forms an excellent source for analysis of learning times. The major treatise on Minoan architecture, Shaw (1971) covers a far wider range of building's than Arnold's focus on stone buildings in Egypt, which largely restricts the focus to monumental public architecture. While Shaw occasionally addresses some mechanics principles, e.g., regarding foundations for column bases to achieve stability (76-77) and selection of stone for strength and weathering of column bases (111-112), the focus is more often on stylistic developments over time. Shaw notes that once the technique of cutting and laying blocks in wall construction was established in the Early Palace period, no further change in techniques occurred, reducing or eliminating the value of chronological distinctions. Possibly this conservatism of Minoan architects and masons, combined with the volume's wide cast of attention spanning monumental palaces with cyclopean wall construction to private houses constructed of rubble walls solidified by mud and lime plaster encourages a certain fluidity in the chronological treatment of techniques, characterized possibly in extremis by an instance to references to EM II and MM III construction in a single paragraph (78). While Shaw's volume is a mine of information on techniques, it is more difficult to use that information to trace the development of architectural problem solving than is the case with Arnold's Chapter 4.

²⁷ Frankfort (1954, 3).

progress, but that does not appear to be a task that has been undertaken. Oates' study of radial vaulting in monumental architecture in ancient Mesopotamia over a period in excess of a thousand years addresses the technical development of the technique and its association with specific schools of architects.²⁸ The study shows that such developments occurred over lengthy periods rather than emerging in final form relatively quickly, although definite numbers for years' durations would be difficult, if not impossible, to estimate.

For the duration of time involved in the spread of an architectural innovation in the ancient Near East, in contrast to the trial and error involved in the initial development of new architectural and engineering knowledge, Harmanşah reports the spread of the use of uncarved orthostats, some of limestone, some of basalt, as wall cladding to protect against weathering of mud brick, beginning in the Middle Bronze Age, around the beginning of the second millennium B.C.E., in northwest Syria and spreading throughout the Levant by the end of the Late Bronze Age.²⁹ Surely learning was involved in the transfer of this new building technology to different regions, although not of the sort involved in its initial development.

Despite these examples, much of the literature on ancient architecture in general has a peculiarly unhistorical cast, which tends not to question deeply how the people of various times and places learned to build complex, sophisticated, monumental architecture, tending rather to note simply when particular features or materials appear. This hiatus in knowledge limits our ability to discern reasonable learning times for construction techniques.³⁰

3.2 Rapid Developments: How Rapid?

The second of Cherry's dissatisfactions with the gradualist hypothesis was the absence of evidence, possibly implying the evidence of absence, that significant advances in social complexity occurred during the Early Minoan III period.³¹ The major differences between the gradualist and revolutionist hypotheses regarding Minoan state formation and urbanization involve the length of time those developments took to happen, as evidenced by archaeological remains during the Early Minoan period: not whether they happened, but when. To my knowledge, however, no one has put numbers to the concepts of either revolutionary or gradual development. It may aid discussion to put some numbers on the table, even though I put them forth (I am not proposing any of them) only as a sounding board.

If revolutionary development means that the social developments and state formation associated with the construction of the First Palaces occurred within the chronological confines of MM IB – MM IIB, that's about 250 years from start to finish, and implicitly the concept of revolution implies that most of the development occurred pretty close to the beginning of this

²⁸ Oates (1990, 403-404).

²⁹ Harmanşah (2007, 74-80).

³⁰ It is possible, of course, to trace the course of architects' recovery of construction skills after the collapse or decline of the Mycenaean civilization and the ensuing Greek Dark Age, from timber constructions of temples at Lefkandi, Argos, Samos, and elsewhere to the probable first stone construction at Thermon in the late seventh century B.C.E. and continuing into the more extensive stone monumental construction of the sixth century. However, this time path of recovery involves both relearning, with ample scope for borrowing from both the Near East and Egypt, and a demand effect in which more expensive construction in stone would have been beyond the capacity of the societies for many decades. Estimating a duration of time required for relearning would be contaminated by the income effect in a way that probably would not exist for Minoan architects and engineers in the early second millennium B.C.E., who were not facing a recovery from a major economic depression.

³¹ Cherry (1983, 33) and (1984, 30-32).

time span. Could that have been as little as 10 years? Or 20? Or 50? Even 100, with the next 150 years being something between smooth coasting or continuing development along the lines of Dabney's continuous development thesis? If we push the initial Protopalatial construction back to sometime in EM III as some scholars have proposed, that adds another 300 years. However, even if we push the date of the first Protopalatial construction back by three centuries, that decision does not tell us anything about the length of time required for the Cretan society to go through the social transformations from a pre-state, rural society to a state capable of mobilizing and concentrating its efforts sufficiently to construct the monumental architecture of the First Palaces. If we think the societal developments had to be pretty well complete by the time the palace construction began, and we have ideas about when that construction began, we still do not know how long it took for the pre-state society to develop into the state society capable of building the palaces. If we adopt the Dabney continuing-development attitude toward state formation, we can drag out the development to a less infirm terminal date (full development), but we still have to guess about a start date (or the length of a developmental period).

As the principal proponent of the revolutionary transformation view, Cherry has not suggested any time periods for a revolutionary development that would contrast strikingly with a gradual development, but in his publications on the subject he does offer several rough chronological periods which he appears to associate with his own period of revolutionary development. In his initial foray into the subject, he set the pre-development stage in the "fifth and fourth millennia B.C.," then proceeded to the statement that "A millennium or so later – certainly by the nineteenth century B.C. – everything is different."³² Does this mean that the developmental period associated with the revolutionary development proposal is, or can have lasted up to 1,000 years or a century or so longer? This may put at least an upper limit on what a revolutionary developmental period is, even if it seems a bit drawn-out. In his second contribution on the subject, Cherry suggests three stages of development: a first stage during the later 4th millennium to the later 3rd as a period when sporadic and strictly local elites began to emerge; a second stage, "more or less" the first half of the second millennium, characterized by a markedly greater scale of capital investment, consolidation of authority, and centralization of wealth; and a third stage in the Late Bronze Age, well beyond the period of concern here.³³ It is not clear whether this implies a 1,500-year duration of social revolution or a 500-year period, or something even shorter. Several pages later in the same paper, Cherry identifies "the centuries before and after c. 2000 B.C.," which he associates with EM III and MM I (presumably both A and B periods, the latter of which experienced the construction of the First Palaces). The "centuries before and after 2000" go on for some 500 years, from c. 2200 to c. 1700, if the expression stands in the EM III and MM I periods, or 350 to 400 years if we exclude MM I B.³⁴ These are periods shorter than a full millennium, but still on a par with the length of time between Columbus' discovery of the New World to the end of World War II, a period noted for several revolutions. In his next contribution to the topic, Cherry asks, "Why then was it only in the two or three centuries immediately preceding palace emergence that there begin to be seen the first signs of incipient stratification and regional differentiation?"³⁵ Possibly we're down to a 2- to 3-century period of revolution. With a 1,500-year period of revolutionary social development, the essential differences between the gradualist and the revolutionary hypotheses

³² Cherry (1983, 33).

³³ Cherry (1984, 29).

³⁴ Using the absolute chronology in Manning (2010, 23, Table 2.2).

³⁵ Cherry, (1986, 43).

may dissolve. What revolution takes 1,500 years? Or even 500? Cherry's most recent suggestion, that "states on Crete appear to have developed with great rapidity during the twentieth century BC, resulting in several first-generation, secondary, palace-based states by circa 1900 BC," in fact possibly to the 75 to 150 years of MM IA alone.³⁶

Cherry of course has not been the only voice proposing developmental periods leading up to the emergence of a state or states on Minoan Crete alternative to the gradualist durations of Branigan, Renfrew, Warren, and Cadogan.³⁷ Todd Whitelaw characterizes the gradualist duration as beginning in EM II and the revolutionary duration as confined to MM I.³⁸ Philip P. Betancourt pushes a configuration of epochal technological changes back to EM I, while the smelting at Chrysokamino began in the Final Neolithic implicitly endorsing a gradual development.³⁹ To add to the complexity of the entire issue of a developmental period and what various students of the subject have in mind when they refer to gradual or revolutionary development or "emergence," Peter Tomkins distinguishes between the emergence of a palace (acknowledging that no one likes the term but that it serves as a common reference now) and the social and political developments he traces back to the Final Neolithic that permitted what he sees as "emergence" in EM II.⁴⁰ Cherry has not been persuaded that either Betancourt or the authors in the Schoep, Tomkins, and Driessen volume favoring a gradualist development have shown any substantive evidence of social complexity prior to the end of the Protopalatial Period, (presumably MM IB).⁴¹ It is possible that students of the topic have different concepts in mind, some of which are less visible archaeologically than others. For example, Betancourt's technological changes in process heat and ceramic production would have facilitated new activities which in due time, possibly a considerable duration of it, would have required social changes to accommodate them, while the archaeological evidence Cherry wants may emerge only in advanced stages of these social changes but depended on prior developments in both production and social technology. Tartaron offers a dispassionate overview of the two major, rival views of the emergence of social complexity and archaic states on Minoan Crete, interspersed with recapitulation of other emerging views on the development of, for want of a better term, governmental organization on the island from the Protopalatial Period through the Neopalatial.⁴²

A single century certainly seems more in line with revolutionary developments, considering all the institutions that would need to be developed and matured. Possibly I am putting too fine a point on this matter of duration, but while I understand archaeologists' reluctance to commit themselves to lengths of time expressed in concepts as precise as numerals when dating to within 50 or 100 years or sometimes even longer is difficult or impossible, numbers are things we can relate directly to people's lives and activities. Sometimes working through one possible number characterizing a duration of time, we can decide whether the proposed period is too short to accommodate the processes under study or is longer than is thought necessary.

³⁶ Cherry (2009, 109, 126-127).

³⁷ Branigan (1970), Chapter 6; Renfrew (1972, Chapters 4-6); Warren (1975, Chapter 4)—a more popular book than the others; Cadogan (1976, Chapter 1).

³⁸ Whitelaw (2011, 115).

³⁹ Betancourt (2008, Chapter 7).

⁴⁰ Tompkins (2011, 74-75).

⁴¹ Cherry (2012, 304).

⁴² Tartaron (2008, 93-100).

It may be useful to compare thinking regarding the time spans over which social complexity grew to result in early states in the major cultural source areas to the east of the Aegean. The study of state formation in Egypt and Mesopotamia has not encountered the sharpness of disagreements over the issue of revolutionary versus gradual development that has characterized Minoan state formation, although differences of opinion regarding duration have emerged. In the Mesopotamian case (possibly “the ancient Near East” is a preferable, more geographically encompassing term) the subject has been both complicated and obscured by the multiplicity of cities and apparent accompanying states, from present-day southwestern Iran through the Tigris-Euphrates valley in Syria. Henry Wright early on suggested the emergence of states by the Middle Uruk period, ca. 3700 B.C.E., after a period of development of some 400 years from dispersed villages to cities and more recently has suggested that “the processes of state emergence . . . [in many ancient societies around the world involve] chronologies representing periods of 100-200 years rather than 500 or more years.”⁴³ Yoffee would place the emergence of the first Mesopotamian states in the late fourth millennium and early third millennium, in developments which “happened rapidly”—over a period of 700 years from villages to cities. Clearly there is no consensus on what duration of time constitutes rapid development.⁴⁴ Egypt’s geography appears to have restricted the scope for regional variation in cultural developments and state formation. Toby Wilkinson is willing to trace the developments leading to state formation to possibly Naqada I (4500-3900 B.C.E.) or at the latest to Naqada II (3500-3300 B.C.E.), with kingdoms that may have qualified for states on many characteristics by Naqada II, although national state formation is customarily attributed to the First Dynasty, ca. 3000 B.C.E..⁴⁵ Developments occurred at different times throughout the Nile Valley and the Delta; progress, if it may be so dubbed, was not uniform geographically. Rough concurrence with this chronological assessment for Egypt is reached by John Baines and Norman Yoffee, whose assessment of Mesopotamian development time is somewhat less precise, with a beginning in the ‘Ubaid period, in the fifth millennium, characterized by few and relatively small sites with “modest degrees of social and economic differentiation,” and resulting in the emergence of the city-state of Uruk in the later Uruk period, a relatively open-ended beginning period and a terminal date of around 3200 B.C.E. (pp. 214-216), easily over 1,000 years.⁴⁶ Jean-Daniel Forest sees social complexity “growing” in Mesopotamia as early as the ‘Ubaid period (ca. 6000 B.C.E.), “increasing” in Uruk (ca. 4100/4000 B.C.E.) and Early Dynastic times, and “culminating” with Sargon’s Akkadian kingdom (ca. 2300 B.C.E.), with some scholars considering the state to have appeared in Uruk times, although Forest prefers to distinguish what he considers the city-states of that period from a full, territorial state imposed by Sargon.⁴⁷ Daniel concludes that, “The Mesopotamian state emerged about 5,000 years later than the first villages in the area.”⁴⁸ Either interpretation of state emergence involves a developmental period of at least 1,500 years. Egyptian urbanization paralleled these developments in complexity and governance structure.⁴⁹ This is a developmental period of 1,000 to 1,500 years, with corresponding growth of urbanization, with clearly traceable changes. A point of slippage in all such duration estimates is the beginning point in time, which typically can be chosen with more

⁴³ Wright (1977, 386-387); (2006, 306).

⁴⁴ Yoffee (2005, 210-211)..

⁴⁵ Wilkinson (1999, Chapter 2).

⁴⁶ Baines and Yoffee (1999, 216-218).

⁴⁷ Daniel (2005, 198).

⁴⁸ Daniel (2005, 203).

⁴⁹ Wilkinson (1999, Chapter 9).

flexibility than the end point, which is generally defined by a clearly observable development of a city or records of the emergence of a dynasty or government. Choice of beginning points for developmental periods tend not to be justified in great detail, probably because of imprecision in dating as well as loose definition of what a starting configuration of societal characteristics ought to be. Additionally it is not obvious that scholars favoring sharply different durations of developmental periods have the same developmental concepts in mind: some seem to focus on something like a final push while others would include what could be called preparatory developments.

To convert calendar time into a human metric, it is useful to think in terms of generations associated with particular spans of time.⁵⁰ Defining the mean length of a generation to be the mean age of mothers giving birth to live daughters, given a society's age-specific fertility and mortality rates, nobody knows exactly what the length of a generation would have been ca. 2000 B.C.E., but 25 years should not be far from the mark, and that number gives an even division of a century into four generations. Somewhere between 3 and 4 generations per century is a reasonable range for that time period. With a 1,500-year development period, we're dealing with 15 to 20 generations. Over 2 to 3 centuries, there are somewhere between 6 and 12 generations, depending on the length of a generation. Generations offer a useful concept with which to think about learning and technological change. As a quick précis, learning takes place over a generation's lifetime; typically a preceding generation is the principal teacher of a successor generation, while learning is reinforced by doing and is forgotten by disuse. Writing certainly would help preserve learning and facilitate its dissemination, although practice combined with written instruction would surely enhance effectiveness. Larger generations (or populations from which generations emerge) offer a greater chance of producing individuals capable of learning intricate techniques and learning them properly rather than only partially and partially incorrectly. The concept of the generation offers a number of avenues for studying social processes that take lengthy durations of time.

4. Synthesis: Fitting the Components Together

The foregoing sections form a coherent program based on the perspective that all parts of a society are linked together, and in very specific ways. Ignoring the first part of that perspective—that the parts are linked—risks developing incoherent models of the process. Ignoring the latter part—that the links are quite specific, concrete in fact—risks developing theories that are impractical. I explain with reference to the subjects of the previous sections.

First, cities are tied to their countrysides because people in the cities have to eat. Ancient agriculture was not particularly productive, meaning that, roughly speaking, every eighteen or nineteen farmers could produce enough food for twenty or twenty-one people, which would permit an upper range of the percent of the population urbanized around 90 percent, a range generally not exceeded in Europe until after 1600 CE and scarcely breached by 1800 CE.⁵¹ There is no reason to believe that agriculture became less productive during those ensuing 3,500 years, nor is there reason to believe that ancient urbanization would have been constrained more by weak pull of demand-side factors (demands for services and for products made in towns and

⁵⁰ I am indebted for the idea of expressing calendar time on a human scale to a conversation with William Parkinson of the Field Museum.

⁵¹ deVries (1984, 39, Table 3.7); Hohenberg and Lees (1985, 84, Table 3.2).

cities) than by the powerful supply-side force of agriculture's ability to feed non-farm populations. Second, this means that if we encounter an ancient city that we think was pretty large, say ten to twenty thousand people, we know that that society had a population that numbered ten to twenty times that size. Third, because transportation was also not terribly productive (I do not say "inefficient" because it probably was quite efficient, just not productive), most of the farmers could not have lived all that far from where they trudged out to work most days, even allowing for the on-and off-peak seasonal character of agriculture. Fourth, this means that most of the residents of large ancient cities could not have been farmers, which means they did something else for a living, from making pots to hammering metal implements to keeping shops of various sorts. These linkages tie the city and countryside together, along with the total population. Fifth, the scope of the monumental architecture in the major Minoan cities, much of it of a cast that in contemporary terms would be called "public," is prime facie evidence that the resources to build and maintain it had to come from a population larger than the city's alone, which means of course that whoever was making the decisions to build the architecture had the right and ability to extract those resources in one way or another, as well as a system for agreeing on what was to be built and where.

Turning to population, we know that ancient populations grew quite slowly by recent standards. Infant and child mortalities were high, maternal mortality was probably high, and even mortality for prime-age adult males was high by contemporary standards. This overarching fact places a fairly low ceiling on how rapidly a population could grow other than through immigration, which together with the relations deriving from agricultural productivity, also places a ceiling on how rapidly emergent cities could grow, in other words, how rapidly urbanization could have proceeded. Since speed, or rapidity, has a time dimension, the length of time required for any degree of urbanization has some rough limits implied.

Moving to the practicalities, control is always difficult, if not impossible in some instances, and power is always limited, but both involve the application of specific social mechanisms. Applied to the formation of ancient states, control would have been exerted through mechanisms such as taxation, be that through in-kind collection of agricultural products or commandeering of *corvée* labor, restricting activities at territorial borders, or laws proscribing or prescribing specific kinds of behavior. Each mechanism through which control may have been exerted can be characterized concretely, even if direct evidence for the mechanism does not exist in either the archaeological or historical record. Specific forms of some mechanisms may be anachronistic, typically because of the technological requirements for implementation, such as retail sales taxes. However, restricting behaviors that few, if any, people would have been able to pursue may not have occurred to the people in power at the time, even if from the perspective of several millennia such restrictions might seem to have added to their prestige among their contemporaries.

Rather roughly speaking, power, applied to ancient state formation, would have involved the ability of the ruler or would-be ruler get what he or she wanted. Applying power through negotiation, howsoever crafty the negotiations may have been, likely would have been cheaper and longer-lasting than applying it through force alone. The need to negotiate, or alternatively to expend resources exerting raw force, implies that the ruler, or would-be ruler, generally would not have gotten all he or she wanted. Even supposedly absolute rulers would have found themselves engaged in what today is called politics.

The importance of imported items, either luxury consumption items such as ostrich egg shells or productive materials such as metals, in early state formation would have been symbolic

rather than economic. The sheer cost of most imported items would have restricted their consumption to the wealthiest members of society without recourse to legal proscriptions on who could possess them, and any prestige conferred by their ownership or display would have been the simple consequence of the intersection of those individuals' wealth and the scarcity of the items. Comprising such a small proportion of a society's total production as imports surely did in the Bronze Age, disruptions in any of them may have precipitated political problems, but even disruption of the small stream of productive intermediate goods such as metals would have been unlikely to cause noticeable economic disruptions—unless the political disruption precipitated a war that destroyed people and property.

No one has thought for a moment that time itself was a causal variable in the social developments leading to or otherwise preceding state formation, but identifying what was involved in the emergence of the various developments that occurred over durations of time surely will propel scholarly inquiry in fruitful directions. I have characterized these developments rather generically as learning of one sort or another although the most common term in the literature is social complexity.⁵² The principal example I offered in the text above was learning about architectural construction since one of the foci of the literature on the rapidity of state formation has been the appearance of the monumental Minoan buildings at the three major palace ("palace") sites. A good deal of the literature has focused on changes in the number and sizes of settlements during the Early Minoan period on the grounds, often left implicit, that increasing size would have meant that people gradually became less likely to know everyone in the settlement. With the greater incidence of anonymity, or at least of the proximity of people not related to one another, pre-existing kinship-based rules for social behavior came under pressures that resulted in the emergence of rules that were grounded in different principles. Various adaptations in political organization, rituals that people devised to maintain various corporate relationships, kinship or otherwise, and surely other aspects of social behavior

⁵² Although that may be changing. Hamilakis (2002, 13-15) associates the term with neoevolutionism and takes users of the term to task for lack of specificity. Haggis (1999, 55-57) explicitly distinguishes the concept of complexity from an "explicitly evolutionary" concept of continually increasing complexity over time, although he concedes that many aspects of Minoan society did in fact become more complex over time. Haggis more recently has extended the discussion of the concept and its relationship to hierarchical relationships versus more or less reciprocal relationships among units (typically settlements) that are roughly peers in terms of many characteristics (sometimes called heterarchy): (2002, 131-132 and 135-137). Parkinson and Galaty (2007, 116) discuss various approaches to the social complexity issue in theories of state formation and relate those approaches to recent emphases on the behavior of individual agents. The current standard approach to these issues of changes in social organization, regardless of nomenclature, primarily revolves around what is observable on the ground, in either surveys or excavations; it may be profitable to supplement this approach with some controlled conjectures regarding what individual people and groups of people did, how those actions might have changed over time and why, then assess what observable or inferable traces those actions might have left. Some important actions or behaviors surely occurred even though no direct traces of them remain. For instance, we know that the ancient Minoans had sexual relations simply because those activities are necessary to produce people, the evidence for whose existence is manifest. Surely there are other such activities that "had to occur" which have left no direct traces. Consideration of social complexity has attracted more detailed consideration in the literature of the ancient Near East than it has in the smaller community writing on the Aegean. In a collection of papers devoted to that subject, Rothman (1994) provides definitions of concepts involved in the study of societal complexity, along with examples of their contents, as well as an overview of criticisms of the concept, and Stein (1994, 11-22) summarizes applications to ancient Mesopotamian societies. Matthews (2003 Chapter 4, especially but not exclusively, 94-102), provides an evaluative review of approaches to thinking about complexity, and in the remainder of the chapter discusses developments in Mesopotamia during the Ubaid and Uruk periods, giving considerable caveats to intercultural comparisons.

comprise the substance of what has been described as increasing social complexity, artifactual evidence of which archaeologists seek, with some resulting degree of controversy regarding interpretation.⁵³ The question I have raised regarding these developments is, “How long did it take these societies to learn these new forms?” There were no political science or sociology or anthropology or city administration textbooks that the Early Bronze Age Cretans could have consulted for organizational options such as are passed out to people in Third World countries today. They had to experiment and find out what worked, or what worked stably and to sufficient benefit of a sufficient proportion of the population.⁵⁴ Naturally, I have not found any answers, but the generic question itself may prove useful in thinking about the duration of time involved in “foundations of Palatial Crete.”⁵⁵

Implicit in the topics pulled together more completely in this section is that the behaviors involved are those of individuals, from the most powerful person in the society (the ruler, or possibly his wife) to the humblest farmer or potter and the nobles in between but clearly closer to the top. Population size and growth result from individual fertility decisions, howsoever influenced by social norms. Agricultural production involves the individual judgments of farmers who, if they were ordered to produce so much of such-and-such, decided the extent of their compliance and their entirely plausible excuses for incomplete compliance (weather and

⁵³ Daniel (2005, 188-196) offers a lucid, if avowedly personal (see 188), interpretation of the issues involved in the development of the typical Mesopotamian state form of governance which involves social adaptation to evolving technological, demographic, and economic conditions, which I have considered examples of learning.

⁵⁴ Wright (2006) develops the concept of experimentation in various governance practices over what he characterizes as cycles of unstable states, each of which stands to learn something from the successes and mistakes of predecessor states.

⁵⁵ Following an overview of discussions of complexity in Aegean and, to a great extent, Minoan contexts, it could be remiss not to note their principal sources of guidance in the literature. Although surely not the first to crack open the black, or at least dark, box of social complexity, in an archaeological setting, McGuire (1983) identified heterogeneity and inequality among individuals as an entry way into the conceptualization of organizational differences among societies—and he offered examples of measurement (101-102). Second, in a more wide-ranging, if somewhat less focused, contribution, Paynter (1989) organized a literature review around the theme of relationships between inequality and social complexity which, *inter alios*., brought in the concept of non-elite resistance to elite power in his discussion of the role of power in societal change. Third, the dual-processual model of societal governance, developed by Blanton et al. (1996), which has been less cited in the Aegean-Minoan literature (although used by Parkinson and Galaty 2007 and referenced indirectly by Schoep 2002), analytically separates centralization and hierarchy, providing explanations for different approaches to the institutionalization of complexity across societies—although the behavior of individuals is not prominent in the model. Fourth, Crumley’s widely cited modification of the concept of hierarchy, which she has named (if not originally) heterarchy, allows for the emergence of multiple, parallel organizations, each of which may have their own internal hierarchies but which are roughly peers of one another in terms of power and influence, with variable ranking of individuals who participate in multiple organizations; her initial exposition is (1979, 143-145) and her most recent (2007). Giddens (1984) crystallized a theory of agency in sociology, an approach to the relationship between social structures and individuals in which agents themselves create social structures while constrained by existing social structures created by their ancestors, may or may not follow leaders, and may resist change, providing behavioral mechanisms for social changes that may be neither stable nor favorable for some or all participants. The emphasis on individual behavior in Giddens’ structuration theory parallels the individual structure of economic theory, although the “agency theory” of sociology bears no relationship to the “principal-agent model” of economics. The agency approach has been employed a number of times recently in Aegeanist literature. Many of these authors have multiple publications on these subjects cited in the Aegean-Minoan literature but which I have not reported here, and I have unintentionally slighted the numerous contributions of Timothy Earle and the late Elizabeth Brunfiel on politics, power, and social complexity in the anthropological and archaeological records. These concepts appear to have considerable, at present, lightly tapped potential for application in the analysis of emergent complexity and state formation on Crete.

rats being the usual suspects). Urbanization involves decisions of individuals to move from the farm to a city, or if they are ordered to move by some high-ranking official, whether to obey dutifully or run away. It also involves the decisions of more powerful individuals regarding what public structures to build (streets, with or without drains, public assembly areas, and of course the monumental buildings) that might make the city a more alluring attraction as well as how to squeeze the resources to build them from their subjects. The contents of “control” and “power” involve the development and implementation of mechanisms to get individuals to do things they would not otherwise do for the most part (e.g., give up part of the food they produce or take their time to work on a more powerful person’s projects) at reasonable costs to all involved as well as negotiations among small numbers of individuals regarding society-wide policies and actions designed to secure the legitimacy among the rank and file of the population of the orders the ruler issues. There are no cybernetic-style social feedbacks which, via some invisible hand, serve to preserve one social structure or erode another. Thus, the set of interactions described above contain aspects of agency, as it has come to be called, in the form of individual decisions (whether genuinely made by single individuals or by groups of individuals reaching a decision most of them can live with) and process, in the form of the societal consequences of the many individual agents’ decisions.⁵⁶

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⁵⁶ Schoep (2006, 49-52) applies a version of the agency concept to the development of the first palace at Malia. Flannery (1999) offers an alternative method of making the agency and process approaches to state formation work together rather than posing them as alternative approaches.

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